temperature, maximum pulse, delirium, hemorrhage, perforation, rash, chills, and mortality.

Type	Duration days	Max. temperature	Max. pulse	Delirious	Haemorrhages	Perforation	Rash	Chills	Died
Typhoid	26.8	103	113	40%	15%	10%	50%	60%	10%
Para Typhoid B. (Homo)	14	102	107	0	0	0	28%	28%	
Para Colon	5	102	110	0	0	0	0	0	
Dysentery (Flexner)	7	102	110	0	0	0	0	0	
Dysentery (Shiga)	0	0	0	0	0	0	0	0	
Colon	0	0	0	0	0	0	0	0	
Para Typhoid	0	0	0	0	0	0	0	0	
None agglutinated	15	102	110	0	0	0	0	20%	

Dilution 1/40—1 hour.

CONCLUSIONS.

(1) Only a little more than half of our patients who came in "looking like a typhoid" gave an agglutination to the typhoid bacillus.

(2) Of this group the average duration of fever was 27 days, 40% were delirious, 15% had hemorrhage, 10% perforations, 50% rose spots and 10% died.

(3) 19% agglutinated para typhoid B. Homo.

(4) On this group duration of fever was 14 days, delirious none, hemorrhage none, perforation none, rash 28%.

(5) 3% (one case) agglutinated para colon and 3% dysentery of Flexner.

(6) 21% did not agglutinate any one of the seven organisms used.

(7) In this group duration was 15 days. There were no complications.

(8) Our "mild typhoids" were in about ½ the cases something else.

THREE CASES OF BERIBERI.

By ALFRED C. REED, M. D., San Francisco,
Clinical Instructor in Medicine, Stanford University Medical School.

Three cases of beriberi have been under observation recently in the Stanford medical service. These have been in no wise atypical but their occurrence shows that this disease is to be considered in California as well as in more endemic areas. There is no reason why it should not appear here if conditions of diet and hygiene are satisfactory for its development.

Case I.—(The first two cases have been reported in detail in the *Journal of the American Medical Association* (Jan. 13, 1917), and abstracts only are included here.) Lung Foo Sing, a Chinese man of 42 years, complained of tiredness and numbness of the legs. The condition was of gradual onset, progressive and first noted some six months before. Family history was unimportant. There were no symptoms referable to the respiratory, circulatory or gastro-intestinal systems, nor was there history or evidence of venereal infection. He had been in the United States for thirteen years, having visited China for more than a year just before the onset of symptoms.

Examination showed a slight cardiac irregularity after exercise, a slight pre-tibial edema, and numbness of both legs below the mid-thigh. A definite but mild peripheral neuritis was demonstrable. The diagnosis rested on the above findings, combined with an absence of fever, albuminuria and other cause for the polyneuritis. He had been exposed to beriberic conditions and his improvement was steady on a proper diet and an iron tonic. A silent tuberculosis could not be positively ruled out but would not have accounted for the full clinical picture, even if present.

Case II.—K. Saito, a Japanese man of 44 years, had been a domestic in the United States for twelve years, with no return to the Orient. He complained of headache, palpitation, insomnia and digestive disturbance. He suffered from dental caries and pyorrhea, had some cardiac hypertrophy with no decompensation and a moderate arterio-sclerosis. Systolic blood pressure was 165 (Faught). There was a deep pre-tibial edema and well-marked peripheral neuritis. The blood picture was not unusual. The stool showed a heavy clonorchis infestation. In the urine was a slight trace of albumin. On examination of the spinal fluid, a suspicious increase of globulins was noted but after a provocative injection of arsenobenzol, the fluid was normal in globulins, cells and Wassermann reaction. The renal excretion of 'phthalein was 85%.

Here the cardiac findings, edema, lack of fever and decided albuminuria, and a polyneuritis, pointed to beriberi. The low grade nephritis, arterio-sclerosis and pyorrhea do not seem responsible for the major condition. This man like the former had been exposed to a beriberic diet without however leaving the United States. The clonorchis infection seemed to have no bearing on the clinical condition.

Case III.—Leong Kee, a Chinese man of 25 years, complained of atrophy and paralysis of all four extremities. He was born in Kum Ling, a village near Canton, China, where he spent the first fifteen years of his life. As a child he frequently suffered from abdominal pain, but this is a common heritage of all Chinese children and is not significant. He had no fever or acute illness. His father and mother both died when he was about five years old. The patient was the eighth of ten children, all of whom are living and well except one who died in infancy.

The patient never did any work in China as he was a student. His diet there was the ordinary one of the country, in which the staple was the usual yellow rice, which was not highly polished. At the age of 15 years he went to San Francisco where he clerked in a Chinese grocery, after several years spending two years at the same trade in San Jose. While nominally a groceryman, he was really a lottery collector. Returning to San Francisco he lived there until March, 1916, when he went to Alaska for employment in the construction of tin cans in a salmon cannery. There his diet was chiefly Chinese imported dry foods, and fresh fish. Once in two weeks he was allowed beef, pork or bacon. The main article of diet was Hongkong rice. He returned from Alaska in September, 1916. It was during the

Alaskan trip that the condition arose which brought him to the hospital.

His habits were not different from the average of his class. For four years he smoked opium excessively, breaking the habit on his return from Alaska in September, 1916. This was accomplished by a Chinese cure consisting of the decoction of the dried residue in opium pipes, which was drunk when the drug desire was strong upon him. The interpreter stated that he had the characteristic appearance which by the Chinese was associated with an opium habitue, namely, "emaciation and black lips." The patient had used alcohol to some extent, as Chinese and American wine and occasionally a drink of whisky. He had been drunk some three or four times. He smoked cigarettes constantly.

The present illness began in Alaska in the early part of August, 1916, with a progressive weakness of the legs and arms, which soon prevented him from working. He then began to have sharp, cramp-like pains in the extremities and much formication. On two separate occasions near the onset, he had decided swelling of the legs which each time lasted from two to three days. At times he suffered much from cardiac palpitation. The weakness and paralysis progressed until he was helpless and was brought to San Francisco in September, 1916.

Examination showed a very emaciated, thin, weak Chinese man, lying helpless in bed. His skin was dry. He had complete wrist and foot drop. The pupils were regular, the left a little larger than the right, and both reacted to light and accommodation. The eye motions were normal. The mucous membranes were pale. There was no deviation or tremor of the tongue. The teeth were in poor condition and subject to caries and pyorrhea. There was a pigmented line about four millimetres from the edge of the gums, which was not a lead line. The right chest was more prominent. The lungs were resonant and no rales appeared.

The apex of the heart was in the fourth left space just outside the mammilary line and 9.5 cm. from the meson. No dullness was found to the right of the sternum. There was a soft systolic murmur at the apex, not transmitted. The second sounds were clear. The pulse was regular, even after some exertion, of moderate tension and the vessel walls were palpable. The abdomen was somewhat distended and tympanitic. No organs or masses were palpable. The epitrochlear glands were palpable, as is common in this race.

Examination of the nervous system showed complete foot and wrist drop and anesthesia to touch and pain in the palms and below a point just above the knees. The Kernig sign was present. No stiffness of the neck was demonstrable. The muscles especially of the forearms and calves showed a decided atrophy. There was deep pain on pressure on the calves and arms. Patellar and Achilles jerks were absent. Temperature sense was not lost. There was a marked reaction of degeneration in the calf and peronei, and in the extensor muscles of the forearms.

The cause of the polyneuritis seemed to lie between alcohol, arsenic and beriberi. The first was hardly supported by the history and the second was excluded by the history. The finding of a right ventricular hypertrophy by the cardiograph, the definite exposure to beriberic conditions, the history of edema at the onset and the absence of a better explanation for the neuritis seemed to justify the diagnosis of beriberi.

The laboratory findings were as follows: Urine showed a faint trace of albumin, no sugar, indican present, a few leucocytes, no red cells, a few hyaline and an occasional granular cast. The blood contained 4,700,000 red cells, 80% hemoglobin by Haldane method, 8500 leucocytes of which 73% were polynuclear, 25% were lymphocytes and 2% were eosinophiles. The stools showed ova of trichocephalus and clonorchis. The Wassermann reaction was negative in both blood and spinal fluid, the latter having normal cytology and no increase of globulins.

All three of these cases showed decided improvement on an antiberiberic diet combined with hematinics and cardiac stimulation. The last is of no small importance as it is a clinical observation that the danger of acute failure of the heart is especially great in beriberi and this constitutes a common tremination of the disease.

Beriberi has come to be considered one of a group of food deficiency diseases, such as pellagra, rickets, scurvy, infantile and other forms of malnutrition. Hence it is evident that beriberi can arise under the greatest variety of conditions, and in fact it is reported from far northern countries as well as from the tropics. There is no inherent reason why it should not develop in California. Milled rice is not at all the only dietary which because of a lack of vitamines may eventuate in beriberi. In fact Draper (*Journal of Tropical Medicine and Hygiene,* April 15, 1916) has recently reported nine early cases out of a crew of fourteen men on a Norwegian bark touching at St. Helena. Several of these cases were so mild as to have passed unnoted perhaps except for the occurrence of two or three more severe cases. Here the victims had eaten very sparingly of rice and had an abundance of fresh vegetables. Thus it is seen that it is not always possible to demonstrate an evidently beriberic diet. In fact it is such instances which lend color to the parasitic theory of etiology of beriberi which is held especially by certain English writers. Thus in his annual report for the health department of Shanghai in 1914, Stanley, who is one of the most competent sanitarians in the Far East, says: "The cause of this disease (beriberi) remains under close observation, though up to the present wrapped in obscurity. The evidence preponderates in favor of the disease being an infective one having no direct relation to food but infective through body vermin." This view does not seem tenable in relation to the American and Dutch results in the East Indies and the Philippines but is mentioned to show the fact that the exact dietary causes can not always be exactly determined.

An interesting point has been noted frequently in connection with emetin to the effect that one prominent symptom of emetin poisoning seemed

to be a condition not to be distinguished clinically from acute beriberi. This observation has been made repeatedly. Also it has been observed that a beriberic condition was a not infrequent complication of bacillary dysentery as well as of amoebic dysentery. This raises a question which apparently is fully answered by J. Preston Maxwell from South China (*China Medical Journal,* July, 1915). Maxwell treated one of his own students for an intestinal amœbiasis with a course of emetin injections and during the course of the treatment the patient developed a well-marked peripheral neuritis which only gradually cleared up. After a considerable period, the same student suffered a second amœbic infection and again received a course of emetin, the dose and preparation used being identical with those of the former attack. But this time Maxwell put the patient on a rice-free anti-beriberic diet and no neuritis developed. It seems clear that emetin or dysentery may thus act as an exciting cause of acute beriberi in a person already subject to the proper vitamine deficiency.

According to Casimir Funk who named the group, there are probably several vitamines or rather a group of them, differing according to their various sources. It has become a practical problem to find an adequate source of vitamines so that a comparatively large dose may be administered in concentrated form. To this end Seidell (Public Health Reports, February 18, 1916), has reported such an extract prepared from brewer's yeast. Seidell's method was as follows: "To a large volume of clear autolyzed yeast filtrate is added fifty grams per litre of the colloidal hydrous aluminium silicate reagent as prepared by Professor Lloyd of Cincinnati for alkaloidal separations. The mixture is well shaken and allowed to stand for several hours, until the supernatant liquid is practically free from suspended solid." The liquid is siphoned off and the solid is again filtered, washed and evaporated to dryness. Seidell found that this material was fully efficient as a cure and as a preventive agent in the neuritis of pigeons induced by a polished rice diet. On the basis of doses found necessary in pigeons, the dose for an average man of sixty kilos would be about five grams per day, which is well within convenient limits of administration. Seidell points out that while there is every reason to believe that this concentrated preparation of yeast vitamine would have a preventive and curative effect in beriberi, it might not prove to be the particular vitamine adapted to the needs of pellagra or other deficiency disease. He says further, however, that the method of preparation is applicable to other raw products and he has already applied it to the potato.

350 Post Street.

THE PREVENTION OF QUARANTINABLE DISEASES ON THE BORDER AND AT PORTS OF EMBARKATION.*

By W. C. BILLINGS, M. D., Surgeon, U. S. Public Health Service. Chief Medical Officer, U. S. Immigration Service, Angel Island, Cal.

It was the original intention that another officer of the Public Health Service should prepare the paper for to-day, but, unfortunately for the pleasure of you gentlemen, since the arrangement was made, that officer has been ordered to El Paso. The title of this article had been selected and was sent to me by him. On looking at the title three things occurred to me, *1st,* that it might be of more interest to you if the talk was not limited to the strictly quarantinable diseases but was a little more comprehensive in character; *2nd,* the word "Border" seemed to be used as if there were but *one* border to the United States, whereas in preventing the entrance of quarantinable diseases there are four borders which must all be guarded; *3rd,* the name of this society—the "Medical Preparedness League." Certain words frequently assume a particular meaning in our minds, a meaning perhaps not literally correct but dependent upon the custom and association of the moment. Words at times have a certain vogue, as do many other things, and I suppose at present the word "preparedness" instantly brings to most of our minds something connected with *war*—it did to mine in this instance, and of a war in which many of our profession have gone to their death.

Records of medical warfare against disease are as old as any historical facts which are presented to us. From the time when the 13th and 14th chapters of Leviticus described the laws to be enforced against lepers down through the period when persons afflicted with certain contagious diseases were pushed out of the community in which they lived to shift for themselves as best they could; from the barbarous peoples in various lands who have made it a custom to destroy at birth physically unfit babies; to the present time when more humane efforts are employed, man has been continuously at war against those disease agencies which he has learned, as his education progressed, are a danger to himself and to his family. Military warfare is intermittent. Exhaustion, defeat, and change of viewpoint occasion its temporary cessation, but our medical enemies neither recognize exhaustion nor acknowledge defeat. If our defensive measures are relaxed for a moment they attack again and more insidiously and more invisibly than military enemies. They never pursue the enlightened policy of a declaration of war, and, before we know it they have out-generaled us, passed our outposts, found a weak point in our main line of defense and appear well organized and ready for extensive action in our very midst. The fact that we are always confronted with a relentless enemy who is ever ready to take advantage of a weak spot, and having gotten the advantage is heartless in the extent of his depredations, has brought most of the enlightened nations to realize that to repel these

* Read before the Medical Preparedness League, San Francisco, Cal., December 7, 1916.